

**Abstract of the Invention**

A civil aviation passive coherent location system and method is disclosed. A receiver subsystem receives reference transmissions from an uncontrolled transmitter. The receiver subsystem also receives scattered transmissions originating from the uncontrolled transmitter and scattered by an airborne object. The received transmissions are compared to determine measurement differentials, such a frequency-difference-of-arrival, a time-difference-of-arrival and an angle of arrival. From the measurement differentials, an object state estimate is determined. A previous state estimate may be updated with the determined state estimate. Processing subsystems determine the measurement differentials and state estimates.